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UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
UTILIZATION RESEARCH

LIST OF PUBLICATIONS AND PATENTS

of the
Northern Utilization Research Branch
Peoria, Illinois

January - June 1955

- - -

PUBLICATIONS

[Publications marked (*) are not available for distribution]

DETERMINATION OF EASILY HYDROLYZABLE FRUCTOSE UNITS IN DEXTRAN PREPARATION.
C. S. Wise, R. J. Dimler, H. A. Davis, and C. E. Rist.
Analyt. Chem. 27(1): 33-36. January 1955.

To establish the extent of removal of interfering fructose polymers in dextran, new analytical methods have been developed. Limited acid hydrolysis followed by paper chromatography qualitatively detects as little as 0.01 percent levan and other easily hydrolyzed impurities. Two quantitative colorimetric methods, one using alcoholic anthrone and the other resorcinol, measure not only free or easily liberated fructose, but also varying proportions of more difficultly hydrolyzed fructose units, such as in melezitose. These methods should prove useful for determining fructose in many products and for obtaining information on the ease of hydrolysis of fructose units present.

The successful application of these methods in studies of dextran preparations suggests application to related polysaccharide preparations.

EFFECT OF SOY FLOUR ON AMYLOGRAMS.
C. W. Ofelt, A. K. Smith, and James M. Mills.
Cereal Chem. 32(1): 48-52. January 1955.

Studies with the amylograph demonstrated that 5 percent added raw soy flour has a liquefying action on starch pastes nearly equivalent to that produced by 15 S.K.B. units malt α-amylase. It was shown that this effect was not due to malt β-amylase.

The factor responsible for liquefaction of starch is heat labile and is inactivated by raising the pH to 11.0 or lowering the pH to 2.0. Commercial soy flours have received sufficient heat treatment to inactivate the factor responsible for liquefaction of starch pastes.

FURTHER STUDIES IN THE EVALUATION OF CARBOHYDRATE UTILIZATION TESTS AS AIDS IN THE DIFFERENTIATION OF SPECIES OF STREPTOMYCES.

R. G. Benedict, T. G. Pridham, L. A. Lindenfelser, H. H. Hall, and R. W. Jackson.
Appl. Microbiol. 3(1): 1-6. January 1955.

Approximately 147 strains of Streptomyces, representing 75 species out of 104 described in the literature, were tested for their ability to initiate in the carbon-free, synthetic basal agar of Pridham and Gottlieb, supplemented singly with 24 different carbon compounds.

Type assimilation patterns are presented for seven species, each containing from three to eight strains. Some variations were encountered among strains of the same species producing different antibiotics.

Of the 24 carbon compounds tested, only four were considered to be of little or no value in establishing differential assimilation patterns. These were erythritol, dulcitol, L-sorbose and maltose.

Since no valid instance of duplication of assimilation patterns occurred among the total 75 species, the authors believe that carbohydrate utilization tests offer promise as an acid in the differentiation of Streptomyces species.

THE MICROBIOLOGICAL PRODUCTION OF GIBBERELLINS A AND X.

Frank H. Stodola, Kenneth B. Raper, Dorothy I. Fennell, Howard F. Conway, Virgil E. Sohns, Cecil T. Langford, and Richard W. Jackson.
Arch. Biochem. and Biophys. 54(1): 240-245. January 1955.

The gibberellins are metabolic products of the mold Fusarium moniliforme and are very active in stimulating plant growth. A dependable method is described for the production of crude crystalline gibberellin in yields of about 12 g. per 160 gallons of culture liquor. This product is a mixture of the known gibberellin A ($[\alpha]_D$ + 36°) and a new gibberellin ($C_{19}H_{26}O_6$) with a rotation of + 92°.

PILOT-PLANT PRODUCTION, TEMPERING, AND EVALUATION OF GLOBAL EDIBLE SPREADS FROM VEGETABLE OILS.

E. B. Lancaster, R. E. Beal, E. P. Jones, C. D. Evans, and J. C. Cowan.
Jour. Amer. Oil Chem. Soc. 32(1): 9-13. January 1955.

Global spread of improved plasticity characteristics has now been produced on a pilot-plant scale using chilling equipment similar to that used in margarine production. A spread produced by the formulation previously described suffered the defect of becoming progressively firmer when stored, consequently, both the "mouth feel" and general acceptability were impaired. This deficiency was largely overcome by tempering at 112° F. for 24 hours in the presence of 0.2 percent soybean lecithin which softens the spread and slows the hardening process. Spreads currently being produced compare favorably with commercial margarines in general acceptability when evaluated at room temperature and are superior in plasticity characteristics when compared at low and high temperatures.

PROTEASES OF THE SOYBEAN.

C. W. Ofelt, A. K. Smith, and James M. Mills.
Cereal Chem. 32(1): 53-63. January 1955.

A new method has been developed for the assay of proteases of soy flour. It has been found that raw soy flour contains 3 to 4 times the amount of protease found in wheat flour, but for properly processed soy flours the protease values are too low to have any marked effect on dough or bread properties.

DEPOLYMERIZATION OF A DEXTRAN WITH SONIC VIBRATIONS OR ULTRAVIOLET LIGHT.

P. R. Watson and I. A. Wolff.
Jour. Amer. Chem. Soc. 77(1): 196. January 5, 1955.

Data are presented on the sonic depolymerization of 2 percent solutions of B-512 dextran and on depolymerization of the powdered solid dextran by ultraviolet light. The former process is analogous to thermal degradation, since the product has a smaller percentage of 1,6'-linkages than the parent dextran. The latter type of degradation is accompanied by some oxidation resulting in production of acidic groups. In neither process was depolymerization carried to the extent that a clinical-type product resulted.

THE POLYESTERIFICATION OF 2,4;3,5-DI-O-METHYLENE D-GLUCONIC ACID.

C. L. Mehltretter and R. L. Mellies.
Jour. Amer. Chem. Soc. 77(2): 427-428. January 20, 1955.

Previous investigation of condensation polymerization of acids derived from natural sugars has been limited to 2,3,4-tri-O-methyl-L-arabonic acid. This paper is a report of the polyesterification of the difunctional substituted sugar acid, 2,4;3,5-di-O-methylene-D-gluconic acid. Rapid condensation of this substance occurs in dry pyridine solution on addition of an equivalent amount of benzoyl chloride or benzoic anhydride. Other aromatic acid chlorides also were effective for this purpose.

Molecular size of polymer fractions isolated, established by elementary analysis and end-carboxyl-group determination, was in the range of 3 to 45 basic monomer units. Behavior of the products in various solvents was also indicative of polymer formation.

GROWTH OF CHONDROMYCES CROCATUS IN PURE CULTURE

C. W. Hesseltine and Dorothy I. Fennell.
Nature 175: 213. January 29, 1955.

This paper reports the isolation of Chondromyces crocatus in pure culture which was formerly believed to require other living organisms for growth. None of the vitamins, amino acids, or growth factors tried, allowed growth. However, a factor or factors in bacterial cells, yeast cells or yeast filtrate, bovine serum, and liver extract brought about growth and sporulation. If an earlier report of the cultivation of this organism in pure culture is accepted as accurate, this communication appears to represent the second report of the growth of C. crocatus free of all other living organisms.

NEW SPECIES AND VARIETIES OF ASPERGILLUS.

D. I. Fennell and K. B. Raper.
Mycologia 47(1): 68-89. January-February 1955.

A great many strains of Aspergillus have been isolated and examined since the publication of the "Manual of the Aspergilli" by Thom and Raper in 1945. Among this number, strains representing five new species and five new varieties have been encountered. The new species and varieties are described in the present paper and include:

Aspergillus paradoxus, Aspergillus aureolus, Aspergillus fischeri var. glabrus, Aspergillus violaceus, Aspergillus nidulans var. acristatus, Aspergillus nidulans var. echinulatus, Aspergillus variecolor var. astellatus, Aspergillus deflectus, Aspergillus silvaticus, Aspergillus terreus var. africanus.

The description of Aspergillus unguis is emended.

APPLICATION OF HIGH-SPEED CENTRIFUGATION TO STUDIES OF PLASTIC SPREADS.

N. N. Hellman, H. F. Zobel, G. E. Babcock, and F. R. Senti.
Jour. Amer. Oil Chem. Soc. 32(2): 73-77. February 1955.

Margarine, butter, shortening, lard, and global edible spread were separated by ultracentrifugation into oil, solids, and aqueous phases. Rate of phase separation and the proportions of the phases were determined by means of the analytical ultracentrifuge. By performing the centrifugation at a series of temperatures, the dependence of solids content upon temperature was obtained.

Amounts of the component phases sufficient for physical and chemical characterization were separated in a preparative ultracentrifuge. However, the solids residue which was obtained contained approximately 50 to 60 percent oil in its interstices. By centrifuging the fat with a layer of aqueous alcohol having a density intermediate to the oil and solids, the solids phase was separated more nearly oil-free.

COLOR CHARACTERISTICS AND CHEMICAL ANALYSES OF OIL FROM FROST- AND WEATHER-DAMAGED SOYBEANS.

Duncan Macmillan and E. H. Melvin.
Jour. Amer. Oil Chem. Soc. 32(2): 85-88. February 1955.

An earlier paper ("Suggested Spectrophotometric Methods for Grading Green Soybean Oil," J.A.O.C.S., 30, 255 (1953)) presented at the 1952 Fall Meeting of the American Oil Chemists' Society gave data about the color of oil from frosted soybeans and suggested spectrophotometric methods for the grading of oil from green soybeans. This earlier work was more a study of a maturity series because most of the soybeans were harvested in a single field at several stages of ripeness. After the soybeans were artificially frosted, the oil was extracted. Spectrophotometric and visual measurements were made on all oils.

It was felt that suggested methods of grading could be made more generally applicable if oils from naturally frosted soybeans were studied. Inquiries brought in several suitable samples of frost- and weather-damaged soybeans. Work on green grading was extended and some changes in the composition and behavior of oils from these soybeans were determined by analysis. While the problem of frost and weather damage seldom affects a large part of the crop, it is great enough to be a continuing source of trouble to processors.

CONSISTENCY CHANGES IN GLOBAL EDIBLE SPREAD CAUSED BY TEMPERING.

N. N. Hellman, H. F. Zobel, and F. R. Senti.
Jour. Amer. Oil Chem. Soc. 32(2): 110-114. February 1955.

Tempering global edible spread at 95° F. or above causes it, first, to become softer, and then, on prolonged tempering, to harden. The higher the temperature in the range 95°-130° F., the more rapid is the course of the consistency changes. Physical studies of the spreads lead to the conclusion that the consistency changes are a consequence of extensive recrystallization of the solid components. The softening occurring in the initial stages of tempering results from (a) weakening of the aggregate structure associated with the method of preparation of the spread, and (b) recrystallization of the solids into more perfectly ordered and sharply defined crystals. The hardening occurring upon prolonged tempering results from further recrystallization of the solids into needle-like and plate-like forms.

A PARTIAL SURVEY OF AMYLOSE CONTENT IN STARCH FROM DOMESTIC AND FOREIGN VARIETIES OF CORN, WHEAT, AND SORGHUM AND FROM SOME OTHER STARCH-BEARING PLANTS.

W. L. Deatherage, M. M. MacMasters, and C. E. Rist.
Transactions (American Association of Cereal Chemists) 13(1): 31-42. February 1955.

Several hundred samples of corn, wheat, and sorghum, many of foreign origin, and lesser numbers of other cereal grains and miscellaneous starch-bearing plants have been studied at the Northern Utilization Research Branch during the past 10 years in a search for a source of starch of high amylose content. The paper summarizes most of the accumulated data for the benefit of other workers who may find them useful in their own research programs and who may be spared labor which would lead only to duplication of the results reported here.

THE SYNTHESIS OF α,α'-THIO-DI-N-CAPROIC ACID.
A. W. Schwab.
Jour. Amer. Chem. Soc. 77(3): 761. February 5, 1955.

α,α'-Thio-di-n-caproic acid has been prepared by the reaction of the sodium salt of α-bromo-n-caproic acid with sodium sulfide.

FLUORESCENCE AS A MEASURE OF BROWN SUBSTANCES IN SOYBEAN LECITHIN.
C. R. Scholfield and H. J. Dutton.
Jour. Amer. Oil Chem. Soc. 32(3): 169-170. March 1955.

The fluorescence of soybean lecithin increases in a linear fashion with an increase in brown substances. Since the measurement of fluorescence is simple and rapid, this measurement should prove a useful index of browning.

KINETICS OF HYDROLYSIS OF ISOMALTOTRIOSE AND ISOMALTOTRITOL.
R. W. Jones, R. J. Dimler, and C. E. Rist.
Jour. Amer. Chem. Soc. 77(6): 1659-1663. March 20, 1955.

A new method, employing quantitative paper chromatography, is described for the determination of degree of hydrolysis of oligosaccharides. Application of this technique to the sugar and its reduced form allows, for the first time, an estimation of the rate of cleavage of individual bonds in a trisaccharide. The position of an α-1,6'-glucosidic bond in a polymer chain is shown to affect its rate of hydrolysis. The nonreducing end bond of isomaltotriose was found to be hydrolyzed faster than the reducing end bond.

THE STRUCTURE OF A NEW STARCH OF HIGH AMYLOSE CONTENT.
I. A. Wolff, B. T. Hofreiter, P. R. Watson, W. L. Deatherage, and M. M. MacMasters.
Jour. Amer. Chem. Soc. 77(6): 1654-1659. March 20, 1955.

Structural studies are reported on a starch containing about 50 percent amylose, derived from a corn variety having a high starch content. The new starch was fractionated after pretreatment in liquid ammonia. Its fractions were characterized by their extent of conversion by beta-amylase, reducing power, iodine-complexing capacity, viscosity, and periodate-oxidation analysis. The amylopectin fraction had unique structure and properties.

*THE USE OF DISTILLERS DRIED SOLUBLES AND SOME OTHER SUPPLEMENTS FOR THE PRODUCTION OF BIOLOGICALS.
Harlow H. Hall.
Proceedings of the 10th Distillers Feed Conference, Cincinnati, Ohio, March 3, 1955. Pages 15-21. 1955.

Industrial fermentations for the production of vitamin B_{12}, riboflavin, vitamin B_{12}-antibiotic complex, antibiotics and fungal amylase in media containing distillers byproducts, soybean meal, etc. are reviewed. Distillers solubles as a source of vitamin B_{13} is discussed. During a recent year 2,400 tons of distillers solubles were used in industrial fermentations. This review article has two tables, one figure and 27 literature references.

METHODS FOR SEPARATING PITH-BEARING PLANTS INTO FIBER AND PITH.
E. C. Lathrop, T. R. Naffziger, and H. I. Mahon.
U. S. Dept. Agr. ARS-71-4, 49 pp. (Processed). March 1955.

Six methods for separation and recovery of pith and fiber from sugarcane bagasse were developed on a pilot-plant scale. Capital costs and operating expenses were estimated for 100 ton/day operations. Pith was loosened from bagasse in a wet condition by means of disc mills or other equipment capable of rubbing fiber bundles together without reducing fiber length. Pith was then removed from the fiber by wet or dry screening. Dried pith obtained from these separations is an excellent absorbent carrier for blackstrap molasses while the depithed fiber is suitable for the production of pulps for fine papers and corrugating boxboard. Both corn stover and papyrus, an Egyptian reed, were separated satisfactorily into pith and fiber by the same methods applied to sugarcane bagasse.

THE GENUS _CIRCINELLA_.
C. W. Hesseltine and Dorothy I. Fennell.
Mycologia 47(2): 193-212. March-April 1955.

A toxonomic study of the genus _Circinella_ has been made. A key is presented for the identification of the eight recognized species including one new species, _C. linderi_. Zygospores of _C. muscae_ and _C. umbellata_ are described and illustrated. Czapek's solution agar supplemented with 1 percent corn steep liquor affords a very excellent substrate for malting compatible strains of this genus.

A NEW SPECIES OF _PENICILLIUM_ FROM SOIL.
Philip A. Orpurt and Dorothy I. Fennell.
Mycologia 47(2): 233-237. March-April 1955.

A new species of _Penicillium_, _P. megasporum_, has been isolated from grassland soil in southern Wisconsin and from heath soil in Suffolk, England.

The species, characterized by unusually large, coarsely echinulate condia averaging 6.5 μ in diameter, produces divaricate penicilli and is assigned to the *P. nigricans* series of the section Asymmetrica-Divaricata.

The new species is considered to represent a possible normal component of the mycoflora of grassland soils.

AUTOXIDATION PRODUCTS OF TRICHLOROETHYLENE.

Leonard L. McKinney, Eugene H. Uhing, John L. White, and Joseph C. Picken, Jr.
Jour. Agr. and Food Chem. 3(5): 413-419. May 1955.

Trichloroethylene readily undergoes autoxidation and about 95 percent is converted into a liquid mixture consisting of about equal parts of dichloroacetyl chloride and trichloroethylene epoxide. The remaining 5 percent is oxidized to equimoles of phosgene, carbon monoxide, and hydrogen chloride.

EVALUATION OF "HYSOY" IN EXTERIOR PAINTS.

A. J. Lewis, H. M. Teeter, W. T. Walton, and R. S. Haines.
Jour. Amer. Oil Chem. Soc. 32(5): 300-302. May 1955.

"Hysoy" is a synthetic drying oil obtained by dechlorination of chlorinated soybean oil. Six exterior white paints were prepared having the same pigmentation but differing in vehicle. Vehicles were linseed oil, soybean oil, Hysoy, and blends of Hysoy and soybean oil. Red-cedar siding panels were given 3 coats of each paint and exposed for 4 years at a 90° angle, facing south, at Peoria, Illinois. Paints containing Hysoy compared favorably in durability with those containing linseed and soybean oils. Principal advantage of the Hysoy paints was a decrease in drying time.

MEASUREMENT OF UREASE ACTIVITY IN SOYBEAN OIL MEAL.

C. Bradford Croston, Allan K. Smith, and J. C. Cowan.
Jour. Amer. Oil Chem. Soc. 32(5): 279-282. May 1955.

The sensitivity and reliability of the commonly used, modified, Caskey-Knapp method and of a titrimetric method to measure relative urease values were improved by modifying test conditions. Another method is presented which measures relative urease activity by electrical conductivity. This conductivity method is superior to the other two for differentiating between commercial soybean oil meals, yet is suitable for routine and control analyses.

SOYBEAN PROTEIN FRACTIONS AND THEIR ELECTROPHORETIC PATTERNS.

Allan K. Smith, Elliot N. Schubert, and Paul A. Belter.
Jour. Amer. Oil Chem. Soc. 32(5): 274-278. May 1955.

The proteins of the soybean were divided into two main fractions, the acid-precipitated and the whey soluble portions. Electrophoretic patterns for the two fractions are shown, containing 5 components each. However, it appears possible that 2 components are common to both fractions.

A method is described for removing phosphorous compounds which react with the proteins of the whey and interfere with protein separation.

TOXICITY OF TRICHLOROETHYLENE-EXTRACTED SOYBEAN OIL MEAL.
Joseph C. Picken, Jr., Norman L. Jacobson, Robert S. Allen, Harry E. Biester, Paul C. Bennett, Leonard L. McKinney, and John C. Cowan.
Jour. Agr. and Food Chem. 3(5): 420-424. May 1955.

Soybeans were reacted with the autoxidation products of trichloroethylene and the resulting material assayed for toxicity with calves. The typical toxicity syndrome of trichloroethylene-extracted soybean oil meal was not produced.

FACTORS AFFECTING MOLECULAR WEIGHT OF ENZYMATICALLY SYNTHESIZED DEXTRAN.
H. M. Tsuchiya, N. N. Hellman, H. J. Koepsell, J. Corman, C. S. Stringer, S. P. Rogovin, M. O. Bogard, G. Bryant, V. H. Feger, C. A. Hoffman, F. R. Senti, and R. W. Jackson.
Jour. Amer. Chem. Soc. 77(9): 2412-2419. May 5, 1955.

The molecular-weight distribution of dextran synthesized by dextransucrase preparations derived from Leuconostoc mesenteroides NRRL B-512 can be varied considerably. A bimodal distribution of molecular weight of dextran is often found. Initial sucrose concentration in reaction mixture affects both yield and molecular weight of polymer synthesized. This may be a reflection of fructose concentration. Presence of maltose in reaction mixture leads to synthesis of oligosaccharides and low-molecular-weight dextran. Low-molecular-weight dextran also functions as "primer" and can be "grown" to higher molecular weight polysaccharide. Formation of low-modal dextran is enhanced by increase in enzyme concentration at 30°. Formation of low-modal dextran is also favored by decrease in reaction temperature. A possible mechanism of enzymatic action operative in dextran synthesis is proposed.

GENERA OF MUCORALES WITH NOTES ON THEIR SYNONYMY.
C. W. Hesseltine.
Mycologia 47(3): 344-363. May-June 1955.

Part of the synonymy of the genera of the Mucorales is given. Likewise, the families are described and keys to the genera within the families are offered. Special emphasis is placed on the Sporodinia versus Syzygites problem.

IMPORTANCE OF OXIDATION ON THE USE OF SOY FLOUR WITH HIGH-EXTRACTION WHEAT FLOURS.
C. W. Ofelt and Allan K. Smith.
Transactions (American Association of Cereal Chemists) 13(2): 122-129. June 1955.

Six wheats, ranging in strength from soft red winter to high-protein hard red spring, were milled, untempered, on a Buehler mill to yield flours with extractions ranging from 83 percent to 90 percent, similar to those used in some sections of Europe. These were baked, using a straight dough procedure, a no-sugar, no-shortening formula, with and without 5 percent added defatted soy flours and at varying levels of potassium bromate. It was shown that the deleterious effect of soy flour on dough-handling properties and bread characteristics could be entirely eliminated by addition of optimum amounts of an oxidizing agent, thus giving bread equal or superior to the control loaf.

PREPARATION AND EVALUATION OF TWO NEW FAT-SOLUBLE METAL INACTIVATORS.
A. W. Schwab and C. D. Evans
Jour. Agr. and Food Chem. 3(6): 518-521. June 1955.

Two new fat-soluble metal inactivators have been prepared and evaluated for stabilization of vegetable oils. One of the compounds, a mono-octadecyl ester of (carboxymethylmercapto)-succinic acid, is of the tridentate type having two carboxy groups in either α or β positions to the coordinating sulfur atom. The other compound, a mono-octadecyl ester of thiodisuccinic acid, belongs to the tetradentate class. Both compounds have the essential structure for effective chelation of metals. The tetradentate compound was not found to be superior to the tridentate compound in stabilizing soybean oil against oxidative deterioration.

PREPARATION OF PHOSPHATIDYL ETHANOLAMINE FROM SOYBEAN PHOSPHATIDES.
C. R. Scholfield and H. J. Dutton.
Jour. Biol. Chem. 214(2): 633-638. June 1955.

A preparative method is described for isolation of phosphatidyl ethanolamine from soybean phosphatides. The alcohol-insoluble fraction of soybean phosphatides is dissolved in chloroform and poured into methanol. Insoluble material is removed by filtration. Lead acetate is added to the methanol solution in order to precipitate inositol-containing phosphatidic acids and other impurities. Phosphatidyl ethanolamine remaining in the methanol solution is recovered in about 85 percent purity. The impurity is mainly sugar-containing material believed to be sterol glycosides. This procedure provides a preparative method for phosphatidyl ethanolamine which has heretofore been lacking.

QUANTITATIVE ELUTION OF MORPHINE FROM ION EXCHANGE RESINS.
Cecil H. Van Etten.
Analyt. Chem. 27(6): 954-957. June 1955.

In studying the use of ion-exchange resins in a method of analysis for morphine, complete elution of the compound from the resin was not always obtained. Consequently, a study was made of the effects of degree of cross linkage of the resin and of the pH and ionic strength of the elutriant of the elution of morphine from strong cation and anion resins. As a result of this study, conditions were found which gave quantitative elution from resins of both types. Behavior of other ampholytes and bases has been examined under the same conditions of elution. Information presented is of value in determining conditions under which these resins may be used to give quantitative separation of morphine prior to analysis.

PREPARATION OF PANOSE BY THE ACTION OF NRRL B-512 DEXTRANSUCRASE ON A SUCROSE-MALTOSE MIXTURE.
Mary Killey, R. J. Dimler, and J. E. Cluskey.
Jour. Amer. Chem. Soc. 77(12): 3315-3318. June 20, 1955.

A new method is presented for the preparation of panose involving the action of culture filtrates of _Leuconostoc mesenteroides_ NRRL B-512, containing dextransucrase, upon a sucrose-maltose mixture. A preliminary study of the effects of variations in carbohydrate and enzyme concentration and in reaction temperature provided a basis for selection of suitable conditions for limiting the reaction mainly to panose formation. The most important variable was found to be the ratio of maltose to sucrose, while the total carbohydrate concentration had a smaller but significant effect. The preparative procedure developed included separation of the synthesized panose from the yeast-treated reaction mixture by chromatography on a carbon-Celite column. The resulting product crystallized readily, and recrystallization did not change its properties.

REPUBLICATIONS

*WHAT CAUSES GRAIN TO SPOIL?
Majel M. MacMasters.
Grain Trade Buyers Guide (published by Grain and Feed Journals, Consolidated) 11: 43-45. 1955.

[Previously published in Grain pp. 4, 6, 8, May 1954, and in Grain and Feed Jours. Consolidated 111(10): 31-33, May 26, 1954.]

CONTRACT RESEARCH PUBLICATIONS

(Report of research work done by outside agencies under contract with the U. S. Department of Agriculture and supervised by the Northern Utilization Research Branch of the Agricultural Research Service.)

THE PHOTOMETRIC DETERMINATION OF THE HEMAGGLUTINATING ACTIVITY OF SOYIN AND CRUDE SOYBEAN EXTRACTS.
Irvin E. Liener, University of Minnesota, St. Paul, Minnesota.
Arch. Biochem. and Biophys. 54(1): 223-231. January 1955.

RESEARCH--THE KEY TO FUTURE MARKETS FOR DRYING OILS.
Odin Wilhelmy, Jr. and Harry W. Barr, Jr., Battelle Memorial Institute, Columbus, Ohio.
Jour. Amer. Oil Chem. Soc. 32(4): 204-207. April 1955.

ADD TO ARS-71-3**

INHERITANCE OF NIACIN, RIBOFLAVIN AND PROTEIN IN TWO OAT CROSSES.
K. J. Frey, M. C. Shekleton, H. H. Hall, and E. J. Benne.
Agron. Jour. 46(3): 137-139. March 1954.

The mechanism of inheritance of niacin, riboflavin and protein was studied in two oat crosses. Transgressive segregation was found for niacin in both crosses. However, in one cross low niacin content was dominant. In both crosses the segregation was transgressive for high but not for low riboflavin content. Low protein percentage was dominant in one of the crosses. Niacin content of the grains was significantly correlated with protein percentage in both crosses. Protein percentage was not correlated with the riboflavin content. It appeared that each of the components was determined by a large number of genes.

** Notice of publication received too late for previous listing.

PATENTS

These patents are assigned to the Secretary of Agriculture.
Copies of patents may be purchased from the
U. S. Patent Office, Washington, D. C.

PROCESS FOR MAKING D-GLUCURONIC ACID AND ITS SALTS.
Charles L. Mehltretter.
U. S. Patent Re. 23,966. March 22, 1955.

The biologically important D-glucuronic acid is prepared by the catalytic oxidation of alpha-methyl-D-glucoside. The desired acid is recovered from the crude reaction mixture by means of an aniline complex.

PROCESS FOR PULPING.
Samuel I. Aronovsky and Elbert C. Lathrop.
U. S. Patent 2,708,160. May 10, 1955.

Cellulosic material such as straw or bagasse is subjected to submerged agitation in a mild cooking liquor at atmospheric pressure. The combined effect of submerged noncutting blows upon the material converts it into the paper-making pulp.

EXTRACTING HEMICELLULOSES.

Michael J. Wolf, John A. Cannon, and Majel M. MacMasters.
U. S. Patent 2,709,699. May 31, 1955.

Hemicelluloses, useful as a replacement from natural vegetable gums in food and coating compositions, are recovered from such materials as corn hulls by an alkali solubilization step (pH 10 to 11) followed by a series of water extractions. The product may be recovered from the extract by spray-drying or by alcohol preparation.

FRACTIONATION OF DEXTRAN PRODUCTS.

Ivan A. Wolff, Russell L. Mellies, and Carl E. Rist.
U. S. Patent 2,712,007. June 28, 1955.

Dextran cleavage products or other mixtures of dextran of widely varying molecular weight is fractionated by selective precipitation with methanol-water mixtures. The selective precipitations are repeated at least once to obtain sharper separations. In the reprecipitations the concentration of methanol for each step is reduced by 0.5 to 1.0 percent concentration to compensate for a residual effect of methanol upon the precipitated material. This procedure results in an increase in yield of the desired fraction.